

MEDICAL BITS FROM YOUR DOCTOR

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“The whole future lies in uncertainty: Live immediately!”.

Lucius Seneca

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“You must be the change you wish to see in the World.”

Mahatma Gandhi

Travel Medicine

International and domestic travel has become routine. It is estimated that in 2019, before the first Pandemic (but not the last) of the 21st century, a record 1.5 billion humans trotted the globe and counted as “international tourist arrivals”. The United Nations World Tourism Organization ([UNWTO](#)) was founded in 1946, based in Madrid, and not only tracks the movement of travelers, but promotes sustainable tourism development and a global code of ethics to protect travelers. According to their [dashboards](#), humanity is well on its way to surpass the pre-pandemic travel records later this year!

“[Travel](#)”, may have derived from the old French word *travail*, meaning “work” and was probably first used in the 14th century, although it may come from the Middle English, *travelen* (torment, labor, strive) or earlier still from the older French *travailler* (work strenuously, toil). No wonder it can feel “exhausting”!

Depending on destination and what is counted as “an illness”, 25% (and up to 60%) of travelers report some ailment. Most of these are mild and self-limited, such as diarrhea, respiratory infections or skin problems. Some are serious and frequently preventable.

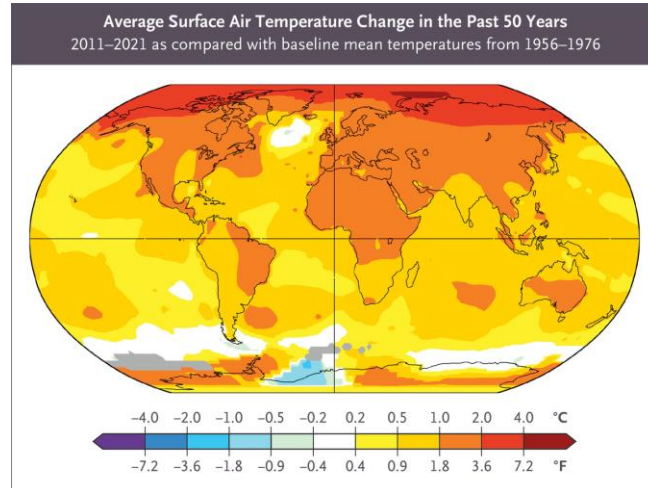
Most travelers do not seek travel advice, unless the journey involves regions with endemic [Malaria](#) (mal-aria or bad air as described by the Romans). About 1500 cases of Malaria are imported into the United States annually, and of course, they can serve as a reservoir from which further transmission could occur as reported by news outlets this past week. But there is no reason to panic. These are rare occurrences.

The celebration of [Summer Solstice](#) in our Northern latitudes (Midsommar) this past week and the long summer days, stimulate our imagination and desire to discover other peoples and regions! The warm temperature, not only increases sexual drive (proven to be higher in tropical latitudes) but also increases the prevalence of gastrointestinal infections, and the activity of “bugs” with the attendant risk of “vector-borne” disease. Therefore, we decided to review Travel Medicine to try and keep you all safe!

Of course, a proper “Travel Medicine” evaluation involves more than just vaccinations. Considerations include host factors (immune-compromise and overall patient medical conditions and risk factors), and geography with awareness of endemic regions for vector-borne diseases (mostly mosquitoes and ticks; occasionally, flies and flees) water-borne diseases (traveler’s diarrhea and GI parasites), respiratory infections and pneumonias (SARS CoV2, Middle Eastern Respiratory Syndrome, TB, viral respiratory infections,

Legionnaire's Disease), as well as non-infectious problems such as traveler's clotting, MVA's, STD's, high altitude sickness and diving complications.

Furthermore, **global warming** is changing the geography of vector-borne



diseases, as arthropods (“bugs”) adapt and expand their reach. Dengue, Chikungunya, West Nile, Zika viral infections are all increasingly emerging in temperate regions of North America and Europe and have all been reported close to home but also in unsuspected places, such as Croatia and France.

I find it surprising that people who would never get on a motorcycle at home, throw all their precautions out the “window” when on vacation and are eager to rent a “vespa” in Rome, a moped in Santorini or decide to ski without helmets or to jump off cliffs without training or consideration of the potential consequences of an accident.

AS A GENERAL RULE, BE MORE VIGILANT AND TAKE ALL THE PROPER PRECAUTIONS YOU WOULD TAKE AT HOME!

DOUBLE UP AND NOT DOWN WHEN TRAVELING AND STAY HEALTHY ON YOUR JOURNEY!

Medical Considerations for International Travel

Ideally, evaluation should be scheduled 1-2 months before departure, as there are several dimensions to consider, such as personal risks, immunizations, vectors of infection and geography.

Risk Assessment	Standard In-Office Interventions	Focused Education before the Trip
<p>Medical history, including medications, disabilities, immune status, immunizations, surgeries, allergies, and pregnancy or breast-feeding</p> <p>Prior travel experience</p> <p>Specific itinerary, including regions, season, and dates</p> <p>Activities (e.g., adventure travel and events involving mass gatherings)</p> <p>Type of accommodations</p> <p>Travelers' risk tolerance</p> <p>Financial challenges</p>	<p>Administration of immunizations</p> <p>Updating of routine vaccines — MMR, Tdap, pneumococcal, varicella, influenza</p> <p>Routine travel vaccines — hepatitis A, typhoid, hepatitis B</p> <p>Special travel vaccines — yellow fever, rabies, polio, meningococcal, Japanese encephalitis, cholera, tickborne encephalitis</p> <p>Malaria chemoprophylaxis (if risk)</p> <p>Individualize to itinerary and patient</p> <p>Travelers' diarrhea</p> <p>Food and water precautions</p> <p>Oral rehydration and use of loperamide and bismuth</p> <p>Antibiotic self-treatment options for severe diarrhea</p> <p>Prophylaxis with bismuth or antibiotic (only if high risk)</p>	<p>Vectorborne diseases (if risk)</p> <p>Personal protection measures for malaria, dengue, chikungunya, Zika virus infection, leishmaniasis, rickettsial disease, sleeping sickness</p> <p>Other travel-related illnesses (as applicable)</p> <p>Altitude illness</p> <p>Travelers' thrombosis</p> <p>Motor vehicle injury</p> <p>Bloodborne and sexually transmitted infections</p> <p>Swimming, water exposure, and marine hazards</p> <p>Transportation-associated illnesses</p> <p>Respiratory infection and tuberculosis</p> <p>Rabies and animal-associated illness</p> <p>Skin conditions and wounds</p> <p>Medical kit and medical care abroad</p> <p>Personal health kit</p> <p>Available medical facilities</p> <p>Evacuation insurance; supplemental health insurance</p>
<p>Freedman DO et al. N Engl J Med ;375:247-260</p>		

Routine vaccines should be verified and updated and travel vaccines evaluated with review of destinations, and planned activities. Precautions to ensure the safety of food and water and avoidance of vectors and insects are most important.

IMMUNIZATIONS

Ideally, pre-travel evaluation should be completed 4-6 weeks before departure, as some vaccines require several doses and a few weeks to achieve adequate protection. Vaccines for travelers may be **required, recommended or routine.**

Required vaccinations:

Yellow Fever.

Yellow fever is a mosquito-borne viral disease endemic in certain small tropical regions of Africa and South America. Mortality is 20-50% and the live virus, attenuated vaccine may be obtained through [registered clinics](#) listed by the CDC.

Recommended vaccinations:

Hepatitis A: If traveling to Central and South America. Monovalent single dose before travel and repeat dose 6-12 months later.

Hepatitis B: consider in non-immune travelers, health-care workers, long-term or those engaging with new sexual partners or piercing/tattooing. 3 dose series over 6 months.

Meningococcal infection: quadrivalent ACWY meningococcal conjugate vaccine for those traveling to sub-Saharan Africa or if traveling to Mecca.

Typhoid Fever: water and food-borne infection caused by Salmonella Enterica-Typhi. Two options: capsular Vi single injection or oral live attenuated vaccine given as 4 pills over 7 days with protection for up to 5 years, but efficacy is only 60-80%. Highest risk is Southern Asia and the likely cause of the [mysterious death of Alexander The Great](#), on June 11th, 323 B.C. at Babylon, ([other possible causes](#) include acute hepatitis, pancreatitis, West Nile encephalitis, Malaria, Influenza and even poisoning).

Rabies: consider vaccination if traveling to rural areas or working with animals, particularly for longer stays.

Japanese Encephalitis: Asian mosquito-borne infection. Consult [CDC travel](#) resource. Two doses 4 wks apart.

Cholera: Severe watery diarrhea transmitted through fecal contamination of water or food. Single dose attenuated oral vaccine approved in 2016 and important for humanitarian personnel traveling to endemic areas.

Influenza: Remains the most common vaccine preventable disease in travelers. Remember that in tropical or subtropical regions, it circulates throughout the year and not seasonally. All humans should be vaccinated.

Measles, mumps and rubella: Those born after 1957 need to receive two doses of the trivalent live attenuated viral vaccine MMR.

Poliomyelitis: All should have been vaccinated, but if traveling to the few remaining endemic areas, a good idea to get a booster vaccine.

Tetanus, Diphtheria and Pertussis: All should receive a booster every decade and pregnant women should get a booster with each pregnancy.

Summary of travel practices to reduce disease:

Table 1. Important Practices for Reducing Disease Risk during International Travel.

<p>Arthropod-borne illnesses (malaria, dengue, chikungunya, Zika virus infection, Japanese encephalitis, leishmaniasis, rickettsial disease)</p> <p>Wear clothing that exposes as little skin as possible.</p> <p>Apply a repellent containing <i>N,N</i>-diethyl-3-methyltoluamide (DEET; concentration, 30–35%) or picaridin* (concentration, ≥20% for tropical destinations).^{15,16}</p> <p>Treat clothing with permethrin (or another pyrethroid) when traveling in an area of very high risk for malaria or other mosquito-borne or tickborne diseases.</p> <p>Apply repellent according to the time of day and type of insects to be avoided.</p> <p>Mosquitoes that transmit malaria (anopheles mosquitoes) are generally night biters.</p> <p>Mosquitoes that transmit organisms causing dengue, chikungunya, Zika, and yellow fever (aedes mosquitoes) are generally day biters with peak biting times in the early morning and late afternoon.</p> <p>Mosquitoes that transmit West Nile virus and Japanese encephalitis (culex mosquitoes) are most active at dusk and again at dawn.</p> <p>Sleep under a permethrin-impregnated bed net, if you are not sleeping in a sealed, air-conditioned room, in areas where there is a high risk of malaria or Japanese encephalitis.</p> <p>Perform a full body check at least once a day in areas where tickborne disease is a risk.</p> <p>Wear light-colored (not blue), heavyweight clothing in areas where African trypanosomiasis is a risk; DEET is generally ineffective.</p> <p>Respiratory infection and tuberculosis</p> <p>Practice hand hygiene diligently.</p> <p>As much as possible, avoid crowded public transportation and crowded public places that are poorly ventilated.</p> <p>Move away from anyone with a persistent or intense cough.</p> <p>Screen domestic workers for tuberculosis.</p> <p>If you are planning a long stay, have a tuberculosis skin test before departure, once per year thereafter, and on returning home.</p> <p>Avoid excessive outdoor activity in areas of heavy air pollution during hot or humid times of the day.</p> <p>Rabies and animal-associated illness</p> <p>Never assume that an animal is free of rabies.</p> <p>Do not handle or feed pets or unknown animals (especially dogs and monkeys).</p> <p>If bitten, scratched, or licked on broken skin, clean the wound immediately with soapy water and seek postexposure treatment for rabies (even if rabies vaccination was completed before exposure) or herpes B virus (transmitted by monkey bites).</p> <p>Consider minimizing going running or bicycling in high-risk rabies areas.</p> <p>Bloodborne and sexually transmitted infections</p> <p>Use condoms in all sexual encounters; unprotected casual sex, whether with local residents or fellow travelers, always poses a high risk.</p> <p>Avoid sexual relations with commercial sex workers.</p> <p>Understand that inhibitions are diminished when traveling away from the social constraints of home; excessive use of alcohol and recreational drugs can influence behavior and encourage unintentional risk exposure.</p> <p>Avoid skin-perforating procedures (acupuncture, piercing, or tattooing).</p> <p>Unless you are in a life-threatening situation, avoid invasive medical or dental procedures in unaccredited medical facilities; request proof of accreditation by Joint Commission International or other international bodies.</p> <p>Consider carrying disposable needles, syringes, and sutures for remote travel.</p>	<p>Travelers' diarrhea</p> <p>Eat well-cooked, hot foods.</p> <p>Always wash hands before eating and after using the toilet.</p> <p>Avoid eating food from market stalls and street vendors.</p> <p>Avoid tap water and drinks or ice made from tap water, unless advised of their safety by a reliable source.</p> <p>Avoid buffets where food covers or fly controls are not used and where food has been sitting out for many hours.</p> <p>Avoid high-risk food such as shellfish, raw or undercooked foods, unpasteurized dairy products, mayonnaise, cold sauces or salsas, fruits you haven't peeled yourself, and salads.</p> <p>Swimming, water exposure, and marine hazards</p> <p>Heed posted warnings and avoid beaches that are not patrolled.</p> <p>Do not swim alone or after dark and do not walk on any beach after dark.</p> <p>Avoid use of alcohol or mind-altering drugs while engaging in water sports.</p> <p>Avoid water where there is sewage contamination or algae are present.</p> <p>Avoid any exposure (e.g., rafting, swimming, or wading) to water known to be infected with schistosomiasis (bilharzia).¹⁷</p> <p>SCUBA dive only with personnel certified by the Professional Association of Diving Instructors (PADI) or the National Association of Underwater Instructors (NAUI) and use equipment only from PADI- or NAUI-certified dive operators.</p> <p>Follow established timetables for air travel after diving.†</p> <p>In tropical waters, watch for jellyfish, sea urchins, and corals.</p> <p>Decline water transportation in vessels without personal flotation devices or life jackets.</p> <p>Wear appropriate footwear when walking, wading, or swimming to avoid injury and exposure to parasites and poisonous plants and animals.</p> <p>Hikers, bikers, and adventure travelers with exposure to water or wet environments may consider prophylaxis with 200 mg of doxycycline once per week (or 100 mg daily if used for concomitant malaria prophylaxis) in developing countries where there is a substantial risk of leptospirosis.¹⁸</p> <p>Since sand may be contaminated in areas frequented by animals, sit on a towel, blanket, or piece of clothing if a chair or hammock is not available. Shake out all fabrics thoroughly after use.</p> <p>Eating predatory reef fish (barracuda, jackfish, grouper, or snapper), even if well cooked, may cause ciguatera poisoning.</p> <p>Eating mackerel, tuna, bonito, mahi-mahi, or amberjack may cause scombroid poisoning.</p> <p>Skin conditions and wounds</p> <p>Broken skin may become infected and lead to serious problems. Any bite, cut, or broken skin should be cleaned with safe water. Apply an antiseptic solution or spray.</p> <p>Increasing pain, redness, or discharge from a cut suggests a spreading infection and may require antibiotic treatment. Seek medical help if this occurs.</p> <p>In Africa, all clothes dried outdoors should be ironed to avoid cutaneous myiasis due to the tumbu fly.</p> <p>Hats and sunscreen are mandatory in the tropics. Sunscreen should always be applied to skin before an application of DEET.</p>	<p>Transportation-associated illnesses</p> <p>To prevent barotrauma, chew or swallow during ascents and descents; feed young children or provide them with a pacifier during ascents and descents.</p> <p>To prevent motion sickness, move to the center of the vehicle; fix your gaze on still, distant objects; and increase airflow across your face.</p> <p>Treatment with scopolamine patches or tablets or with meclizine, initiated before departure, may minimize symptoms of motion sickness during a cruise or travel on rough roads. Ondansetron has not been shown to prevent nausea due to motion sickness.</p> <p>If you are traveling east across more than three time zones, you can expose yourself to light early in the day, advancing the body clock so that it will be synchronized with the new time zone. Conversely, if you are traveling west, you can expose yourself to light at dusk and in the early part of the evening, delaying the body clock so that it will be synchronized with the new time zone. Crossing more than eight times zones in either direction reverses the time for morning or evening light.</p> <p>Zolpidem and possibly melatonin offer some benefit in adapting to local sleeping cycles.</p> <p>Medical kit and medical care abroad</p> <p>Carry a compact medical kit that includes the following:</p> <ul style="list-style-type: none"> Simple first-aid supplies, such as bandages, gauze, hemostatic gauze, antiseptic, antibiotic ointment, butterfly bandages, skin glue, and splinter forceps. A thermometer and antipyretic agents. Antifungal creams, cough and cold remedies, antacids, hydrocortisone cream, and blister pads. Condoms. Sunscreen and insect repellent. <p>Adequate medical and evacuation insurance should be arranged, even for short trips.</p> <p>Contact information for hometown medical providers, health insurance carriers, and a medical assistance company should be accessible at all times.</p> <p>If you are planning a long stay, integrate into the local expatriate medical infrastructure (i.e., become familiar with the doctors, hospitals, pharmacies, and ambulance services that cater to foreigners) immediately after arrival so that you can seek competent care for any illness early in its course.</p> <p>If you have cardiac disease, carry a copy of a recent electrocardiogram on a portable USB drive or make sure the electrocardiogram can be accessed on the Internet.</p> <p>Carry all medicines in labeled prescription bottles.</p> <p>Carry a list of medical conditions, allergies, and medications with dosages.</p> <p>Prevention of motor vehicle and other injuries</p> <p>Avoid overcrowded transportation.</p> <p>Do not drink and drive.</p> <p>Keep automobile doors locked and windows closed at all times, if possible.</p> <p>Seek vehicles with seat belts, which may result in extra expense; decline vehicles without seat belts unless no other choice is available.</p> <p>Decline transportation in vehicles with worn tires, worn brakes, or inoperative lights.</p> <p>Avoid driving at night or alone, and never drive outside urban areas after dark.</p> <p>Never drive a motorcycle or scooter abroad; wear a helmet if you are a passenger.</p> <p>Use a helmet when bicycling, skiing, or skating.</p> <p>If you are planning a long stay, arrange for a locally purchased mobile phone to be in the vehicle, if possible.</p>
<p>Freedman DO et al. N Engl J Med ;375:247-260</p>		

* Picaridin products available in the United States with 20% concentration include Natrapel (Tender Corporation) and Picaridin Insect Repellent (Sawyer). Picaridin is also known as icaridin in some countries. Picaridin, unlike DEET, has a pleasant smell and does not dissolve plastic materials.

† The time from the end of the dive until the boarding of an aircraft is generally between 12 and 24 hours, depending on the type of dive.

Prophylactic Medications

The most important, pertain to **Malaria** prevention. Malaria was recognized at least 4,000 years ago in Ancient Egypt, described by Hippocrates in 400 B.C. and so deadly that after the start of Agriculture in the Neolithic Revolution almost 12,000 years ago, Malaria shaped natural selection and was responsible for the increasing prevalence of genetic conditions that provided resistance and increased survival if infected, such as Sickle Cell, G6PD deficiency and Thalassemia. Malaria has been around for millions of years and its genome has been isolated from mosquitos preserved in amber from the Paleogene Period dating back 30 million years!

This protozoal parasite, may have killed **billions** of people since the dawn of humanity, and continues to sicken almost 200 million humans annually, killing more than 600,000 of them. Fortunately, a new malaria vaccine designed for young children (most vulnerable and with highest mortality) is available in Africa but it is not appropriate for visitors with low risk of disease.

What is the risk of contracting malaria without prophylaxis? Per month of travel, it is about 3.5% monthly in West Africa, 0.35% in the Indian subcontinent and 0.035% in South America. But transmission is focal, as the lifetime range of anopheles mosquitos is only 1 km and they bite from dusk to dawn.

Alternatives for Malaria Prophylaxis:

Drug (trade name)	Tablet Size	Adult Dose	Use in Children†	Use in Pregnancy	Initiation	Discontinuation
Primary drug for all malaria species in all areas						
Atovaquone-proguanil (Malarone and generics)	Adults: 250 mg of atovaquone and 100 mg of proguanil; children: 62.5 mg of atovaquone and 25.0 mg of proguanil	250 mg and 100 mg once daily	Yes; FDA-approved for body weight ≥11 kg (for weight of 5 to <11 kg, recommended off-label by CDC)	No (insufficient data; not recommended by CDC)	1–2 days	7 days
Alternative drugs for all malaria species						
Mefloquine hydrochloride (generics only in U.S.)	250 mg (228-mg mefloquine base)‡	250 mg once weekly	Yes, all ages	Yes	3 wk preferable; 1–2 wk acceptable	4 wk
Doxycycline hyclate (Vibramycin, Vibra-Tabs, other brand names, and generics); doxycycline monohydrate (Monodox, Adoxa, and generics)	Hyclate: 20 mg, 50 mg, 100 mg; monohydrate: 100 mg	100 mg once daily	Contraindicated for age <8 yr because of staining of dental enamel	No (teratogenic)	1–2 days	4 wk
Alternative drug for areas with exclusively chloroquine-sensitive malaria						
Chloroquine phosphate (generics only in U.S.)	500 mg (300-mg chloroquine base); some generics available in 250-mg tablets (150-mg base)	500 mg once weekly	Yes, all ages	Yes	1 wk	4 wk
Alternative drug for areas with exclusively Plasmodium vivax malaria						
Primaquine phosphate for primary prophylaxis (off-label use)§	26.3 mg (15-mg primaquine base)	30-mg base once daily	Yes, all ages	No (potential toxic effects for fetal erythrocytes)	1 day	7 days
Primary drug for relapse prevention (P. vivax or P. ovale only)						
Primaquine phosphate for relapse prevention	26.3 mg (15-mg primaquine base)	30-mg base once daily	Yes, all ages	No	As soon as possible after exposure, for which another agent taken for primary prophylaxis	14 days total

Freedman DO et al. N Engl J Med ;375:247-260

* Initiation is defined as the time before the first exposure to malaria, and discontinuation as the time after the last exposure (with the exception of primaquine phosphate for relapse prevention, for which discontinuation is 14 days after the start of primaquine). AV denotes atrioventricular, G6PD glucose-6-phosphate dehydrogenase, and RCT randomized clinical trial.
 † See <http://www.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/malaria#4661> for dosing information for children.
 ‡ In some countries, 250-mg Lariam tablets contain 250 mg of mefloquine base, equivalent to 274 mg of mefloquine hydrochloride.
 § Intensive-exposure areas warranting postexposure primaquine treatment after any trip duration include but are not limited to Papua New Guinea, Timor-Leste, and certain areas of Indonesia. In other areas with *P. vivax* or *P. ovale*, persons who have had prolonged exposure (>6 months) or intensive exposure should consider postexposure primaquine treatment.

Insect Protection:

- Cover skin as much as possible.
- Apply DEET 30-35% or picaridin 20% for tropical destinations.
 - Picaridin has pleasant smell and does not dissolve plastics.
 - DEET ineffective: flies and kissing bugs (Trypanosomiasis).

- Treat clothing with permethrin if traveling in high-risk area for mosquito or tickborne diseases.
- Malaria mosquitoes (*Anopheles*) are night biters.
- Dengue, Chikungunya, Zika and Yellow Fever (*Aedes*) are day biters (early morning and late afternoon).
- West Nile and Japanese E. (*Culex*) prefer dusk and dawn.
- Sleep under permethrin-impregnated bed net or sealed AC room.
- Perform a full body check daily if there is a tick or flea risk.
- *Rickettsia africae* (ticks, mites, fleas) is the second most common cause of fever in those returning from Africa, after Malaria.

Traveler’s Diarrhea:

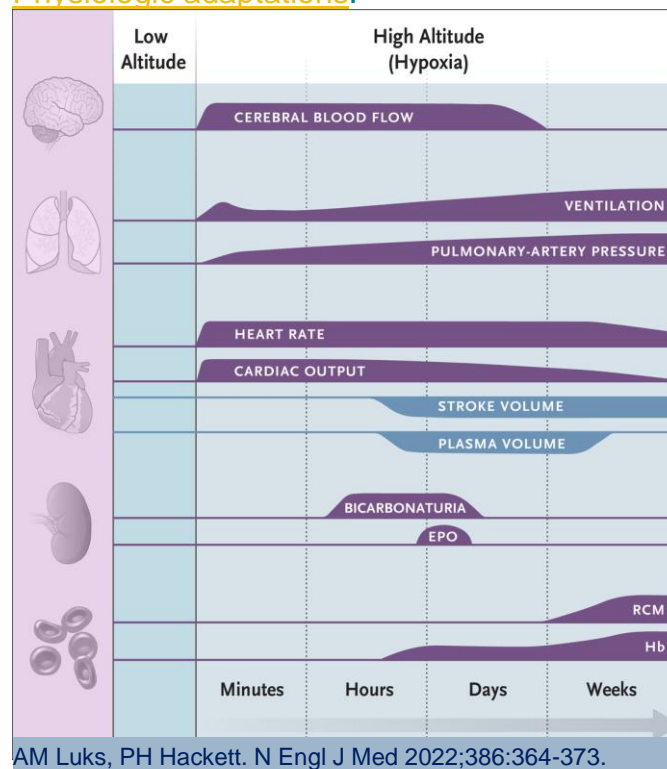
Defined as > 3 unformed stools/day while traveling or up to 7 days after travel and it is usually caused by bacteria, but protozoa such as amebiasis and in particular viruses (norovirus and rotavirus) are increasing. Use of proton-pump inhibitors (Prilosec, Protonix, Nexium, etc) increases the risk as it lowers the “infectious dose” by lowering gastric acidity.

Treatment includes oral hydration, antimotility drug such as loperamide (Imodium AD), and a single dose or 3 days of ciprofloxacin - levofloxacin or azithromycin should be considered to shorten the course of disease (which is usually self-limited and lasting no more than 7 days). If traveling to Southeast Asia, India or Nepal, best to use Azithromycin as most enteric causes are resistant to other drugs. Preventive antibiotics are not recommended.

Altitude Sickness

Most people who ascend rapidly > 3000 meters suffer some consequences from declining atmospheric oxygen.

Physiologic adaptations:



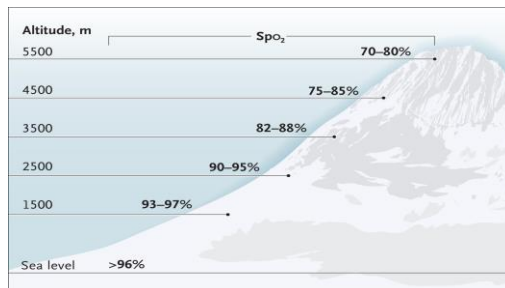
Problems develop usually above 2500 meters, but in some individuals, they can ensue above 1500 m. Starting acetazolamide 125 or 250 mg once or twice daily may help prevent problems:

Table 1. Clinical Problems at High Altitude.*

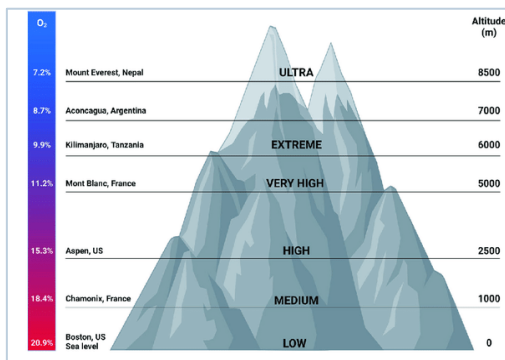
Illness and Clinical Presentation	Prevention	Treatment
High-altitude headache Common above 2500 m Onset within 4–24 hr after ascent Dull or pulsating bifrontal, temporal, or diffuse headache, often worsened by movement	Allow time for proper acclimatization For moderate- or high-risk ascent profiles: acetazolamide, 125 mg every 12 hr, or dexamethasone, 2 mg every 6 hr	Stop ascent and rest at current elevation NSAIDs or acetaminophen Consider dexamethasone (4 mg once) for severe headache If headache persists or worsens, descend or use supplemental oxygen
Acute mountain sickness Common above 2500 m Onset within 1–2 days after ascent Headache, plus one or more of the following: poor appetite, nausea, vomiting, lethargy, persistent lightheadedness Normal neurologic examination and mental status	Allow time for proper acclimatization For moderate- or high-risk ascent profiles: acetazolamide, 125 mg every 12 hr, or dexamethasone, 2 mg every 6 hr	Stop ascent and rest at current elevation NSAIDs or acetaminophen for headache; antiemetics if needed For mild illness: consider acetazolamide, 250 mg every 12 hr For severe illness: dexamethasone, 4 mg every 6 hr for 24 hr; consider adding acetazolamide If symptoms persist or worsen, descend or use supplemental oxygen
High-altitude cerebral edema Unusual below 3500 m unless accompanied by high-altitude pulmonary edema Onset within first few days after ascent; often preceded by symptoms of acute mountain sickness Global encephalopathy, with altered mental status, ataxia, or both; focal neurologic deficits uncommon Can progress to coma	No specific preventive measures aside from those for acute mountain sickness and high-altitude pulmonary edema	Descend if feasible; otherwise, use supplemental oxygen or portable hyperbaric chamber Dexamethasone, 8 mg once, then 4 mg every 6 hr until descent has been achieved or symptoms and signs have resolved
High-altitude pulmonary edema Unusual below 3000 m Onset 2–4 days after ascent Early signs: increasing dyspnea with activity, decreased exercise performance, dry cough Late signs: dyspnea with simple activities or at rest, cyanosis, cough with pink frothy sputum, respiratory distress	Allow time for proper acclimatization Sustained-release nifedipine, 30 mg every 12 hr, for travelers with history of high-altitude pulmonary edema	In resource-limited settings: descend if feasible; otherwise, use supplemental oxygen or portable hyperbaric chamber Sustained-release nifedipine, 30 mg every 12 hr if oxygen is not available and descent is not feasible In well-resourced settings: supplemental oxygen and bed rest
Central sleep apnea Very common above 2500 m Onset during first night at high altitude; may persist with continued stay or further ascent Associated with reduced subjective sleep quality, frequent awakenings, and sensation of panic on awakening	Prophylaxis generally unnecessary If indicated, acetazolamide, 125 mg every 12 hr, or nocturnal oxygen	Descent not necessary Treatment reserved for severe sleep disturbance or interference with daytime activity: acetazolamide, 125 mg every 12 hr; nocturnal oxygen Temazepam, zolpidem, and zaleplon improve sleep quality but do not reduce central sleep apnea

AM Luks, PH Hackett. N Engl J Med 2022;386:364-373.

As we gain altitude, barometric pressure decreases and



consequently, the partial pressure of O₂ in our atmosphere. Above 5000 m, the content of O₂ is too low and cellular function is disrupted. The 20% O₂ content at sea level declines to 15% at 2500 m and to 11% at 5000 m.



Curiously, beyond the 29082 ft of Mt Everest, atmospheric O₂ content is incompatible with life.

Clotting Disorders:

Risk of deep vein thrombosis or pulmonary embolism is very low after flights < 6 hrs, but the risk increases in those with cancer, heart failure, dehydration, some autoimmune conditions and certain medications, including birth-control pills.

Preventive measures:

- Avoid dehydration
- Consider using graduated compression stockings
- Consider using a tablet of apixaban (Eliquis) or rivaroxaban (Xarelto) or lovenox prior to departure.
- Aspirin is of no benefit.
- Aisle sitting promotes mobilization which helps.

In Summary:

- 1- USE COMMON SENSE: Wash hands frequently and before eating, avoid tap water, ice and raw foods.
- 2- Chlorination kills most bacterial and viral infections, but protozoal cysts of Giardia, Amoeba and Cryptosporidium may survive.
- 3- Eat meals well-cooked and while still hot.
- 4- Avoid undercooked fish or meat and unpasteurized dairy products.
- 5- Carrying antibiotics for Traveler's Diarrhea and UTI's is a good idea.
- 6- If the turns and twists of the journey bring about a closer and intimate contact, remember to use barrier methods, as STD's, Hepatitis B, C, HIV and other conditions may seriously blemish your travel experience if "common sense and preventive strategies" do not prevail.
- 7- Travel with an "emergency kit", with bandages, sun-screen, repellent, antacids, anti-inflammatories, acetaminophen, antifungal creams, antibiotics (ciprofloxacin and doxycycline) and possibly antivirals.
- 8- If you are at increased risk of clots, use compression stockings and move around every couple of hours while flying. If you have a history of clotting, taking a tablet of Xarelto or Eliquis before your trip has not been studied, but a reasonable precaution to put in motion.
- 9- If all fails, access to your doctor at the time of "trouble", is invaluable.
- 10- Does my insurance cover medical problems abroad? [This article](#) suggested by one of my patients, is worth reviewing.
- 11-Health information for international travel:
<https://wwwnc.cdc.gov/travel>

MEDICAL CONDITIONS: Lyme Disease

Lyme Disease is the most common tickborne illness worldwide and not necessarily a "travel associated condition" as it is all around us. The reported seroprevalence is almost 15% and highest in the temperate

regions of the Mid-Atlantic and Northeastern regions of North America, but also, central and western Europe and East Asia.

Transmission of this tick-borne disease caused by the spirochete (type of bacteria) “*Borrelia Burgdorferi*” is most common in the late Spring and Summer months, since it is most effectively transmitted by the third “nymphal” stage of the evolution of the *Ixodes Scapularis* (NE and Midwest) or *Pacificus* (W) ticks (deer ticks). In Europe and Asia there are other species of *Borrelia*, in addition to “*Burgdorferi*”.

Clinical Points:



Shapiro ED. N Engl J Med 2014;370:1724-173

- Erythema migrans”, a small red spot that slowly becomes larger is the most common initial manifestation. More than ½ of cases do not have a “bull’s-eye” appearance.
- Usually, a single skin lesion. It may be associated with fatigue, malaise, headaches, muscle and joint aches.
- It may also lead to disseminated disease with neurologic problems (such as nerve palsies) and an “aseptic” meningitis. Arthritis and carditis may occur.
- Antibody testing is not indicated early on. Not helpful.
- Treatment with doxycycline, amoxicillin or cefuroxime is safe and highly effective for early Lyme Disease.
- A single 200-mg dose of doxycycline reduces the risk of Lyme disease. Some experts recommend 100 mg twice daily for 2 days for prevention.
- There is NO evidence that patients treated for Lyme Disease who have persistent fatigue, malaise, arthralgia or difficulty concentrating, have a persistent infection. The risk of prolonged treatment far outweighs any “potential” benefits.

Potential coinfections w other tickborne conditions should be considered:

Infectious Agent†	Characteristics
<i>Babesia microti</i> ¹	An intraerythrocytic parasite that can cause fever and anemia; usually cleared spontaneously by immunocompetent persons; may cause life-threatening illness in persons who are elderly or immunocompromised
<i>Anaplasma phagocytophilum</i> ¹	An intracellular bacterium that may cause severe acute illness, with fever, leukopenia, and thrombocytopenia
Deer tick virus ¹⁷ (a type of Powassan virus)	Can cause a serious, sometimes fatal encephalitis
<i>Borrelia miyamotoi</i> ¹⁸	Member of the relapsing-fever group of borrelia‡
Ehrlichia species Wisconsin	Intracellular bacterium‡

* Coinfections should be considered when patients with Lyme disease have severe or prolonged manifestations of infection or have anemia, leukopenia, thrombocytopenia, or unusually high or persistent fever.

† Like infection with *B. burgdorferi*, infections with these organisms are transmitted by ixodes ticks.

‡ There are few reports of humans infected with either *B. miyamotoi* or ehrlichia species Wisconsin, so the frequency and full spectrum of their manifestations remain to be determined.

If you find the tick, you can take a picture and [uploaded](#) for feedback on species and risk of disease. A wonderful service from the University of Rhode Island: [Tickencounter.org](https://www.tickcounter.org)

And if you need more information:

<https://www.cdc.gov/lyme/index.html>

<https://www.nejm.org/doi/full/10.1056/NEJMcp1314325?triggerTool=savePage>

DEBUNKING MYTHS: Q & A

I am breathless with exertion, so I need Oxygen supplementation.

Myth! Oxygen is an essential gas that makes us more efficient at extracting energy from our food sources via aerobic metabolism (as opposed to anaerobic which is more than 10X less efficient!). As you know, one of the main ingredients that promoted the birth and evolution of complex multi-cellular organisms on planet Earth, and eventually those most complex creatures called Humans, was the progressive rise in Oxygen concentration which took billions of years and rose as a consequence of the metabolic activities of simple life forms, such as algae, phytoplankton, and stromatolites. The latter ones can be found in the northern coast of Australia and some have been dated to be 3.8 billion years old. Our blood becomes almost completely saturated with Oxygen once the partial pressure of O₂ reaches 65 mmHg. Studies have shown that transient and mild to moderate low levels of Oxygen saturation between 88-92% are well tolerated and correction with supplemental Oxygen does not change prognosis or outcomes! The next time you watch a football game and see the players running to the bench to breathe some O₂, or pass by an Oxygen bar in New York, you will hopefully shrug your shoulders and smile!

I am taking antibiotics and can't have a drink! *Myth!*

This myth originated from a study of an antibiotic called metronidazole (Flagyl) from reports published in the 1960's which were not reliably scrutinized. A randomized trial in healthy volunteers with moderate alcohol intake conducted in 2002 showed no rise in acetaldehyde levels, no increase in nausea or symptoms. Other antibiotics are less likely to pose problems, but it certainly makes sense to moderate alcohol consumption anyway.

My medication has expired, so it will no longer be effective. *Myth!*

Several studies have demonstrated that most medications retain at least 90% potency (standard measure of efficacy) for up to 5 years past the expiration date, including Epi-Pen, ciprofloxacin, doxycycline, analgesics etc. The only expired medication ever reported to cause toxicity was a tetracycline (now off the market) in 1963. Stability of drugs has been proven in sealed containers for up to 40 years past their expiration date!

RECOMMENDATIONS:

Please, make plans to receive the new RSV vaccine (respiratory syncytial virus), High Dose Influenza vaccine (older than 65) or Flublok for those older than 50 but younger than 65 and the bivalent Covid-19 vaccine booster by the fall.



HAPPY SUMMER from The Picones!

If you have 10 minutes, enjoy this [time-lapse of the Entire Universe](#).

If you have another 10 minutes, read Dr. Fauci's [reflections](#).

If you have 6 more minutes, the [massive expanse of our Universe](#) and the magnificent insignificance of humanity will delight you.

You will not be able to watch these two [videos](#) without [smiling](#).

If you have [7 minutes daily](#), you can start to improve your [fitness](#) right now with the Scientific 7- Minute Workout. [Get the app](#) on your phone!

[11 more minutes](#) will get you in shape!

For core strength, try this [9-minute routine](#)!

AND START EXPLORING AND PRACTICING [MINDFULNESS](#)! It will also help you lower your blood pressure and levels of stress. It will raise pain threshold and your overall sense of well-being.

THERE ARE MULTIPLE [RESOURCES](#) ON THE WEB.

Let's all remember that the only certainty in life, is death and the only fountains of youth proven by science and experience are love, exercise, laughter, humor and a positive attitude!

OFFICE UPDATES

- Olivia Dragovits (oliviad@chevychasepulmonary.com) is my assistant, always ready to help with her wonderful demeanor and multi-tasking abilities, as she works towards her Medical School acceptance.
- Samantha Morales has left for Medical School, but we are lucky to have Emily Swearingen who has stepped into her big shoes.
- Nicole Loy and Jonathan Sir are excellent and will continue to assist with your office needs as they work towards Medical School acceptance.
- Andrew Fookes will be attending Medical School at Georgetown University nearby and Nicholes Rhinesmith is moving to Nashville to attend Physician Assistant school at Vanderbilt University. We are interviewing to get support for your Respiratory Therapy needs.

Wishing you a Happy and Healthy Summer!

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